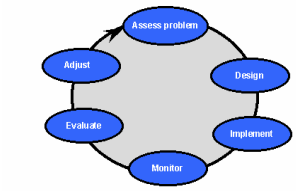

Case Study: Adaptive Management of the Flower Garden Banks

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Overview – The Minerals Management Service (MMS) is responsible for leasing federal lands of the outer continental shelf (OCS) for oil and gas exploration and development. As industry began planning for operations in the deep water of the Gulf of Mexico in the early 1970s, MMS began writing EISs for lease sales and created an environmental studies program to support analyses. Studies documented, among other things, thriving coral reef communities at the unique "Flower Garden Banks" (FGB) in the northwestern Gulf of Mexico. Recognizing the need to ensure the protection of these reefs in the face of uncertain impacts, MMS sponsored the first "multiple-use" meeting in 1973, which brought together the oil and gas industry, the general public, academia and private contractors. This and numerous other meetings and public hearings culminated in several mutually agreeable concepts to protect the reef communities, including stipulations for monitoring and adaptive environmental management.

The MMS “stipulation” specified the protective measures. The stipulation became a part of the lease document and thus was binding on the lessee. The stipulation for the FGB established a no activity zone (NAZ) and a four mile "shunt" zone. The NAZ, where no activities can take place, protects the bank's biota from mechanical damage due to drilling, platform and pipeline emplacement, and anchors. The shunt zone, in which all effluent from the drilling process must be shunted to near the sea floor, was designed to prevent drilling discharge from reaching the bank's unique biota. As part of the stipulation, lessees had to monitor environmental conditions at production sites and at the banks themselves under strict MMS guidelines.

As more was learned about the banks through the studies program and monitoring, the stipulation was modified to reflect the best possible information, and the provisions of the latest stipulation applied to appropriate blocks regardless of the older stipulation in the lease. After several years and numerous monitoring reports, MMS knew no damage was being done to the banks or the coral habitat. MMS showed great flexibility at this time in reducing the stipulation for compliance monitoring at production sites. At the same time, MMS recognized the need to continue to monitor the condition of living reefs. It became clear that the banks were being severely damaged from sports fishing and commercial vessels anchoring on the shallow coral reefs. Marine scientists from an environmental group, the Gulf Reef Environmental Action Team (GREAT), conceived of a way to prevent anchor damage while not discouraging visitors. MMS provided personnel to help GREAT install 12 anchor moorings at the banks, so vessels can tie up easily and not drop anchor.

MMS developed a multi-disciplinary long-term program of studies to describe the FGB and similar topographic features in the region, initially costing over $1 million per year. As further information was gathered and analyzed, the program was refined to reduce the number of cruises and dives, cutting annual costs to about $200,000. Performing these reductions in a stepwise fashion assured MMS received the information necessary to monitor the health of the banks. In 1992, the FGB were designated a National Marine Sanctuary. Primary responsibility for protection of the reefs passed to the National Oceanic and Atmospheric Administration (NOAA) although MMS continues a cost-sharing agreement with NOAA for the long-term monitoring

program. In 1994, the NOAA National Marine Sanctuary Program presented a recognition award to MMS for over 20 years of commitment to resource protection and funding of surveys and research at the FGB. In May 1996, MMS won the Fourth Annual Federal Environmental Quality Award for its outstanding NEPA program, given jointly by the Council on Environmental Quality and the National Association of Environmental Professionals.

Management issue that was the primary driver – The primary driver for developing a FGB monitoring program was the protection of this unique and possibly fragile coral reef environment as offshore oil and gas development activities and other human uses increased in the area.

Uncertainties that led to AM approach being selected (i.e., the various alternate hypotheses related to the management action – Management actions related to environmental protection and offshore oil and gas activities include avoidance of areas for all industry activities as well as the development of mitigation measures such as lease stipulations for activities to be conducted in or near areas of concern. There were uncertainties concerning the nature, extent and causes of impacts to corals in the FGB as well as effective mitigation. Monitoring helped resolve these uncertainties and MMS was able to adapt management accordingly.

Monitoring and science framework developed to support AM – As discussed above, the monitoring framework is based on repeated sampling of corals and other faunal components of the FGB system to determine "health," and sampling of physical and chemical parameters to assist in the interpretation of biological results.

Partner, stakeholder involvement versus traditional approaches – The NOAA National Marine Sanctuary Program is a partner and stakeholder. Other stakeholders include sport fishers and SCUBA divers who use the FGB. They are used as additional sources of information through established observer programs. Although it has since dissolved, GREAT was an important partner in terms of adapting better strategies of protection.

Financial cost of implementing AM – Monitoring at the FGB is approximately $200,000/year with costs equally shared by MMS and the NOAA National Marine Sanctuary Program. Total cost from 1970's to present is over $3,000,000.

Costs or consequences of not applying AM – Monitoring results have shown that the living corals of the FGB remain healthy and growing. Long-term monitoring has confirmed and continues to validate the present understanding that lease stipulations provide effective mitigation of potential impacts from oil and gas operations. The cost of not applying AM could be a degraded coral reef system.

Limitations of AM in this case – The FGB characterization studies and monitoring were not developed as an application of AM.

Greatest challenges or constraints that have been overcome or that remain – The greatest challenge is maintaining priority for the continued funding of research and monitoring of the FGB after 20+ years of completed studies. Truly "long-term" studies are always difficult to justify for continued support.

Time line for implementation of AM – - Initial studies were conducted in the late 1970's and early 1980's to characterize the biological communities and physical environment of the FGB and other topographic features in the central and western Gulf of Mexico. This characterization was needed to serve as a basis for future monitoring designed to detect any potential impacts related to

offshore oil and gas activities or other human uses of the FGB such as fishing and SCUBA diving. Actual monitoring with repeated sampling of established stations using a set sampling protocol began in the late 1980's.

Benefits provided by AM to date – - Continued health of the living coral reefs of the FGB. There has also been a benefit to the agency – MMS has received two environmental protection awards in recognition of the FGB studies and the resulting adaptive management applied to offshore oil and gas lease management decision-making.

Specific best management practices resulting from AM – Recognition of importance of verifying the effectiveness of mitigation measures that are applied to offshore oil and gas leases. In the FGB case, field monitoring has provided verification.